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ESTIMATES OF SPORT EFFORT AND HARVEST OF CHINOOK SALMON IN THE KLUTINA RIVER, 1988[1]

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX TABLES

ABSTRACT

Roving creel surveys were conducted to estimate effort for and catch and harvest of chinook salmon *Oncorhynchus tshawytscha* in the sport fishery in the Klutina River from 1 July through 21 August 1988. These surveys estimated that boat anglers expended 201 boat-trips during this period. Guided boat anglers accounted for 83.8 percent of the total boat effort. Shore anglers expended an estimated 1,377 angler-hours of effort during this period. The combined effort resulted in the catch (fish kept plus fish released) of 1,048 chinook salmon of which 42.9 percent (450) were harvested (fish kept only). Guided boat anglers accounted for 89.7 percent of the total chinook salmon catch and 82.9 percent of the total harvest during the survey. The 1.3 age group was the most abundant age of chinook salmon in the sport harvest. A 1-day-per-week closure of the sport fishery was the preferred management option of interviewed anglers.

KEY WORDS: creel survey, Klutina River, chinook salmon, catch, harvest, effort, age, length, management options.

INTRODUCTION

The semiglacial Klutina River (Figure 1) supports the second largest chinook salmon *Oncorhynchus tshawytscha* sport fishery in the Upper Copper River basin. Effort in this fishery has risen steadily in the past 5 years (Figure 2) with guided anglers comprising an increasingly important segment of the fishery. Sport harvest of chinook salmon on the Klutina River averaged 441 fish annually from 1983 through 1987 (Mills 1984-1988) accounting for 16.5% of the annual sport harvest of chinook salmon in the Upper Copper River basin. Total effort and harvest are expected to continue to increase as guides and the angling public become more aware of the sport fishing opportunities on the Klutina River.

Shore anglers primarily fish the lower 1 mile of the Klutina River near Copper Center along the Richardson Highway while float anglers access the river at Klutina Lake. Boat anglers use the launches at Copper Center and can fish the entire river, but most of the boat fishery takes place in the lower 8 river miles. The fast water of the Klutina River makes this a challenging boat trip and limits it to only the most experienced boaters equipped with large jet riverboats.

Very little creel data exists for the Klutina River chinook salmon fishery (other than the effort and harvest data information from the statewide mail survey) and little information is available on stock status. The semiglacial water conditions of the river limit aerial surveys of chinook salmon distribution and spawning to the few clear water tributaries entering the uppermost portion of the river and Klutina Lake. As a result, only a few hundred spawners are observed annually. An unknown, but probably much larger number of chinook salmon spawn in the mainstem Klutina River where most of the sport fishery takes place. It is imperative that effort, harvest, and stock status data be collected given the expected continued growth of this fishery.

The data collection efforts during 1988 are part of a larger effort to describe the chinook salmon stocks in the Upper Copper River drainage. Concern for these stocks lies in the potential for their over-exploitation in the commercial marine fishery. In addition to the commercial fishery, chinook salmon are also the target of sport anglers, subsistence fishwheels, and personal-use fishwheels and dip netters. It is estimated that 70% to 80% of the chinook salmon stocks bound for the Copper River drainage are presently harvested by all user groups combined (Figure 3) (Brady et al. 1988; Mills 1984-1988). Data from surveys such as this will provide quantitative baseline information needed to determine the present levels of sport effort and chinook salmon harvest. This will allow for more effective management of the sport fishery and insure the long-term protection of these stocks.

The objectives of this report are to present: (1) estimates of angler-effort for chinook salmon in the Klutina River; (2) estimates of the harvest (number of fish kept by anglers) and catch (number of fish kept plus those released by anglers) of chinook salmon; (3) estimates of the sex, age, and length compositions of sport harvested chinook salmon; and (4) estimates of angler preference for management options for the Klutina River chinook salmon sport fishery.

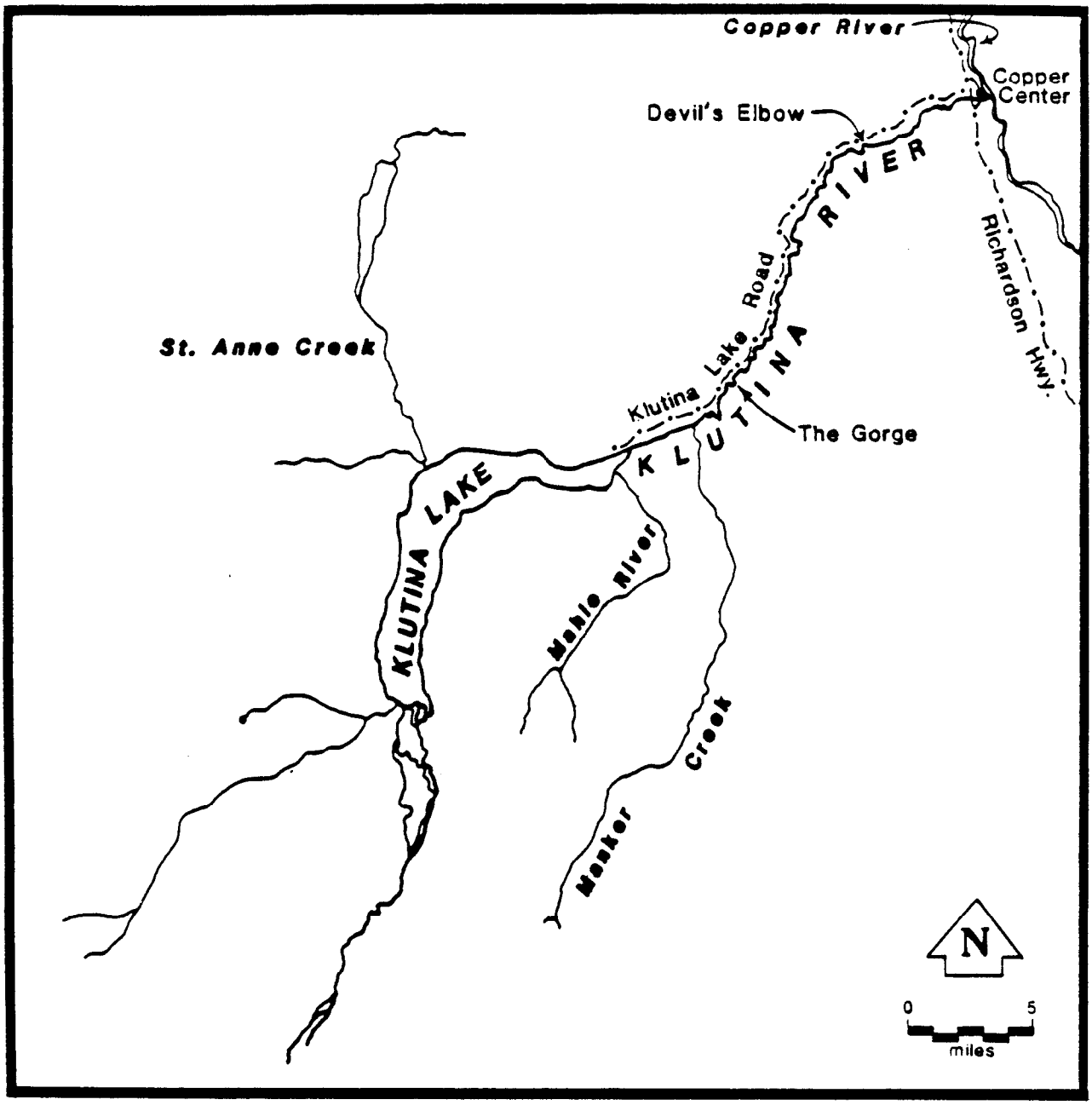

Figure 1. Map of the Klutina River.

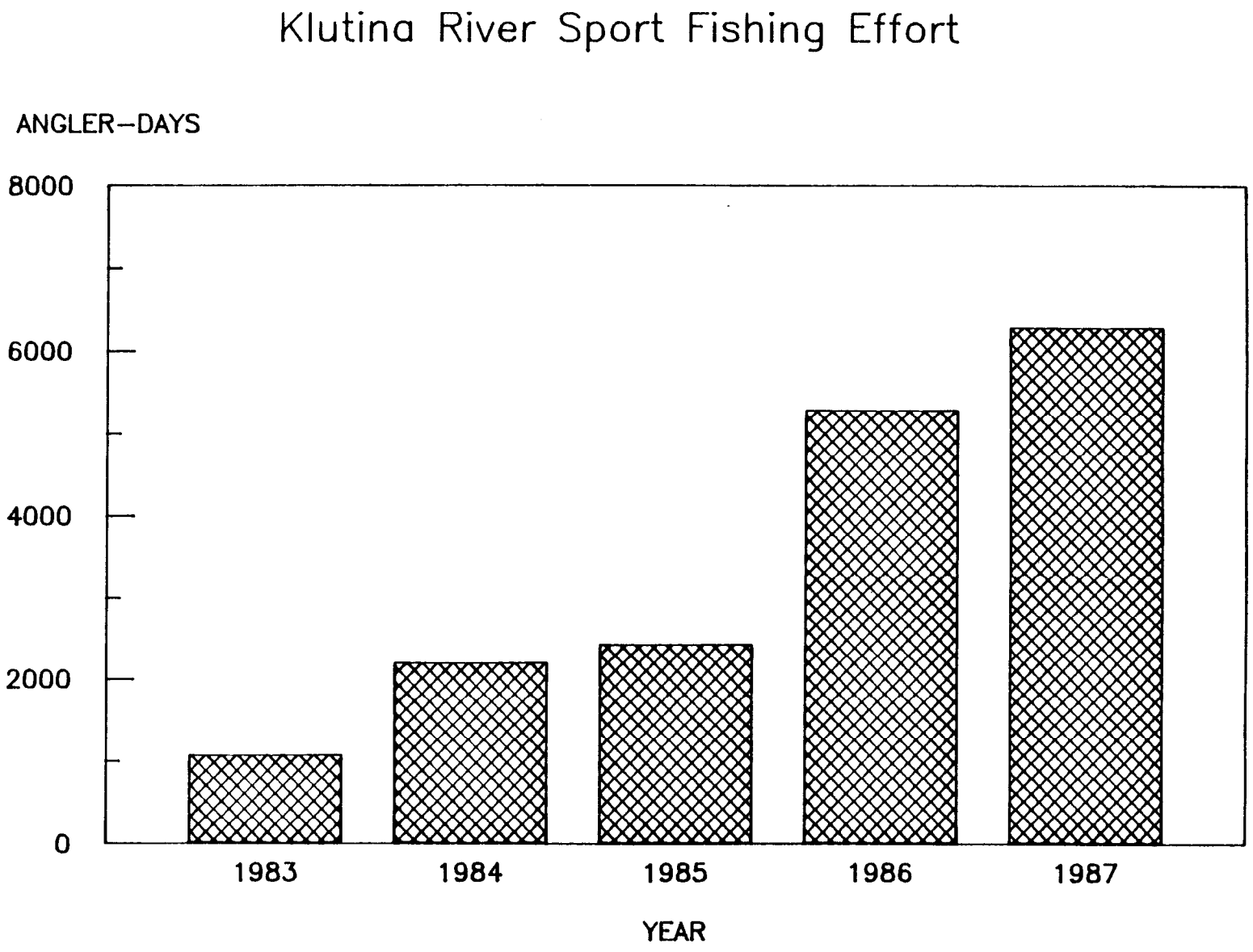

Figure 2. Sport effort in the Klutina River during the years 1983 through 1987.

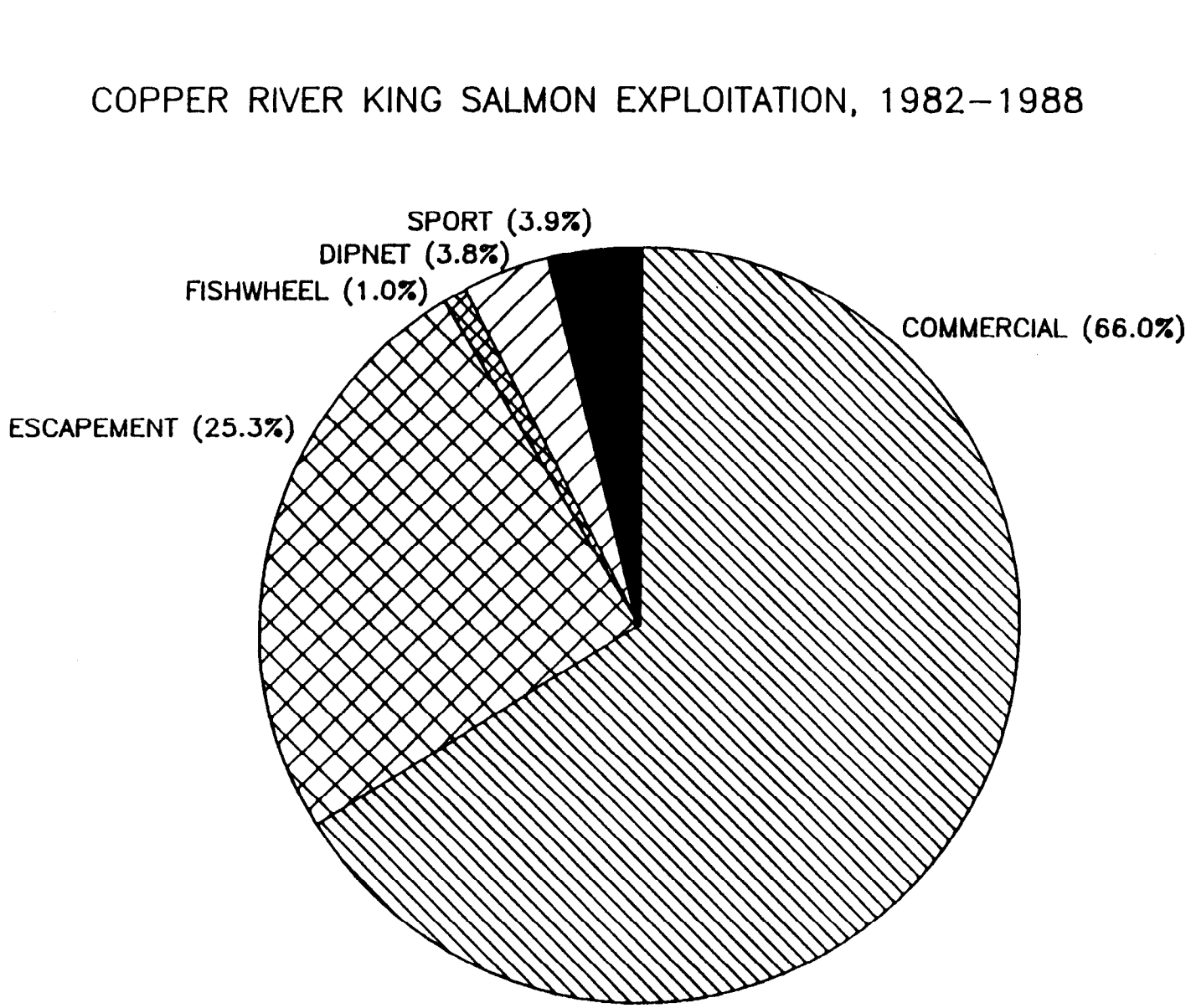

Figure 3. Estimated exploitation by user group of Copper River chinook salmon, 1982-1988.

METHODS

Creel Survey

A stratified random creel survey was conducted to estimate effort, harvest, and catch of chinook salmon in the Klutina River from 1 July through 21 August 1988. The survey consisted of two components: (1) a survey of the boat fishery conducted at the Copper Center boat launching area, and (2) a survey of the shore fishery along the 1 mile reach of the Klutina River located within Copper Center.

Boat Fishery:

A stratified random sample design was used to estimate effort, catch, and harvest of chinook salmon in the boat fishery in the Klutina River. Days were stratified into four 3.5-hour periods (A: 0800-1130 hrs, B: 1131-1500 hrs, C: 1501-1830 hrs, and D: 1831-2200 hrs). All weekend/holiday days and 3 of the 5 weekday days were sampled each week. The weekdays not sampled were selected by randomly choosing 1 weekday and then randomly choosing the day before or the day after it. Two 3.5-hour sample units were randomly selected, without replacement, within each day. Because this was a newly surveyed fishery and use patterns had not been established, allocation of sampling effort was evenly distributed among the four periods.

Counts of all boats returning to the survey area during the sampling period were used to estimate fishing effort in units of boat-trips. Interviews of returning boat anglers were used to estimate chinook salmon catch and harvest rates (number of fish per boat-trip). For each returning boat, the following information was collected:

1. the number of anglers in the boat,
2. the number of hours fished,
3. the number of chinook salmon caught and harvested, and
4. whether or not the boat was guided.

All interviews were completed-trip interviews. Interviews for effort and harvest information were party interviews for all anglers in a returning boat.

Angler effort and its variance for boat anglers were estimated separately for weekdays and weekend/holidays for guided and unguided anglers. The number of boat-trips of effort in each fishery stratum i ($\hat{B}_i$) was estimated by:

$$\hat{B}_i = \sum_{j=1}^{p} N_{ij} \bar{b}_{ij} \quad , \qquad [1]$$

where:

$\bar{b}_{ij}$ = the mean number of boats returning during period j in stratum i, and

N_{ij} = the total number of sample units (3.5-hour time periods) possible during period j in stratum i.

The variance of $\hat{B}_i$ was estimated in the following manner (Schaefer et al. 1979):

$$V(\hat{B}_i) = \sum_{j=1}^{p} N_{ij}^2 \, [s_{ij}^2/n_{ij}][1-(n_{ij}/N_{ij})] \ , \qquad [2]$$

where:

N_{ij} is defined as above,

n_{ij} = the total number of sample units surveyed during period j in fishery stratum i, and

s_{ij}^2 = the sample variance for the mean number of boats returning during period j in fishery stratum i.

The total number of boat trips for the Klutina River fishery was estimated by summing the estimates for each stratum of the fishery. These are considered independent estimates and the estimated variance of the total is the sum of the variances.

Catch per unit effort (CPUE) was estimated as mean catch per boat-trip for each stratum. Mean CPUE for stratum i ($\overline{CPB}_i$) was calculated by:

$$\overline{CPB}_i = \left(\sum_{k=1}^{t_i} c_{ik}\right)/t_i \ , \qquad [3]$$

where:

t_i = the total number of boats interviewed during stratum i, and

c_{ik} = the catch of chinook salmon by boat k interviewed during stratum i.

$\overline{CPB}_i$ was estimated by a two-stage sampling design with days being the first stage sample unit (of which there are a finite number available to be sampled) and boats being the second stage sample unit (of which there are an unknown number available to be sampled on any given day).

The variance of $\overline{CPB}_i$ was estimated in the following manner (Von Geldern and Tomlinson 1973):

$$V(\overline{CPB}_i) = [1 - d_i/D_i)] \, s_B^2/d_i + \left(\sum_{j=1}^{d_i} s_{ij}^2/m_{ij}\right)/d_i D_i \ , \qquad [4]$$

where:

d_i = the number of days in stratum i during which interviews were conducted,

D_i = the total number of days in stratum i,

s_B^2 = the between-day variance of $\overline{CPB}_i$ in stratum i,

s_{ij}^2 = the sample variance of $\overline{CPB}_{ij}$ on day j in stratum i, and

m_{ij} = the number of boats interviewed during day j of stratum i.

Between-day variance was calculated as:

$$s_B^2 = [\sum_{i=1}^{d_i} (\overline{CPB}_{ij} - \overline{CPB}_i)^2]/(d_i-1) \quad . \qquad [5]$$

The number of chinook salmon harvested during the weekday or weekend/holiday stratum (C_i) of each fishery segment was calculated as follows:

$$\hat{C}_i = \hat{B}_i \overline{CPB}_i \quad . \qquad [6]$$

The variance of $\hat{C}_i$ was estimated using the formula for the product of two independent random variables (Goodman 1960):

$$V(\hat{C}_i) = [\hat{B}_i^2 \, V(\overline{CPB}_i)] + [\overline{CPB}_i^2 \, V(\hat{B}_i)] - [V(\hat{B}_i) \, V(\overline{CPB}_i)] \quad . \qquad [7]$$

The total chinook salmon catch by the boat fishery (C_T) was estimated as follows:

$$\hat{C}_T = \sum_{i=1}^{S} \hat{C}_i \qquad [8]$$

where i is one of four fishery strata. Because these are independent estimates, the estimated variance of the total is the sum of the variances.

Harvest rate and harvest were estimated as described above with the exception that the number of chinook salmon kept by anglers was substituted for the catch terms in equations 3 through 8.

Assumptions necessary for the creel survey analyses of the boat fishery include:

1. Interviewed boats are representative of the total population.
2. No significant fishing effort occurred between 2200 and 0800 hours.

3. Boat counts and catch per boat are normally distributed random variables.

Shore Fishery:

A roving creel survey (Neuhold and Lu 1957) was used to count anglers and conduct angler interviews of shore anglers fishing the lower 1 mile of the Klutina River. The creel survey followed a stratified random sample design. The sampling schedule and allocation of sampling effort were the same as outlined for the boat fishery.

Angler counts were used to estimate fishing effort in units of angler-hours and angler interviews were used to estimate catch and harvest rates (number of fish per hour) of chinook salmon. Counts of all anglers actively fishing were conducted during a randomly selected 15 minute interval during randomly selected sampling periods and were considered instantaneous. Interviews of shore anglers were conducted concurrently with the interviews of returning boat anglers during the time remaining in each randomly selected sampling period. For each shore angler interviewed, the following information was obtained:

1. the number of hours fished,
2. the number of chinook salmon caught and harvested, and
3. whether the interview was a completed-trip interview or not.

Catch per unit effort (catch per angler-hour) was estimated for each stratum in the following manner:

$$\hat{E}_i = \sum_{j=1}^{p} H_{ij}\bar{x}_{ij} \ , \qquad [9]$$

where:

$\bar{x}_{ij}$ = the mean number of anglers counted during period j in stratum i, and

H_{ij} = the total number of sample units (3.5-hour time periods) possible during period j in stratum i.

The variance for the estimate of total effort was calculated in the following manner:

$$V(\hat{E}_i) = \sum_{j=1}^{p} H_{ij}^2 \, s_{ij}^2/n_{ij} \ , \qquad [10]$$

where:

n_{ij} = the total number of sample units surveyed during period j in fishery stratum i, and

s_{ij}^2 = the sample variance for $\bar{x}_{ij}$.

Catch per unit effort (catch per angler-hour) was estimated for each stratum in the following manner:

$$CPUE_i = \sum_{k=1}^{m_i} c_{ik} / \sum_{k=1}^{m_i} e_{ik} , \qquad [11]$$

where:

m_i = the number of anglers interviewed during stratum i,

c_{ik} = the catch of chinook salmon by angler k interviewed during stratum i, and

e_{ik} = the effort (number of hours expended) by angler k at the time of the interview.

Omitting the finite population correction factor, the variance of $CPUE_i$ was approximated in the following manner (Jessen 1978):

$$\hat{V}(CPUE_i) \approx (\bar{C}_i/\bar{E}_i)^2 \left[s_C^2/\bar{C}_i^2 + s_E^2/\bar{E}_i^2 - (2r_i s_C s_E/\bar{C}_i\bar{E}_i)\right] , \qquad [12]$$

where:

$\bar{C}_i$ = the mean catch of chinook salmon by anglers in stratum i,

$\bar{E}_i$ = the mean effort by anglers in stratum i,

s_C^2 = the two-stage variance of the mean catch ($\bar{C}_i$),

s_E^2 = the two-stage variance of the mean effort ($\bar{E}_i$), and

r_i = the correlation coefficient for the c_{ik} and e_{ik}.

The total chinook salmon catch ($\hat{C}_i$) for each stratum of the shore fisheries was calculated by:

$$\hat{C}_i = \hat{E}_i CPUE_i . \qquad [13]$$

The variance of $\hat{C}_i$ was estimated using the formula for the product of two random variables from Goodman (1960) provided earlier.

Catch was estimated for the shore fisheries and then summed to estimate the total season catch. These are considered independent estimates, therefore, the estimated variance of the total was the sum of the variances.

Harvest rate and harvest were estimated as described above with the exception that the number of chinook salmon kept by anglers was substituted for the catch terms in equations 11 through 13.

The major assumptions for the shore creel survey analyses include:

1. Incomplete trip angler interviews provided an unbiased estimate of completed-trip CPUE.
2. Catch rate and length of fishing trip were independent.
3. Interviewed anglers were representative of the total angler population and anglers were interviewed in proportion to their abundance.
4. No significant fishing effort occurred between 2200 and 0800 hours.
5. For the angler interview data, effort and catch were normally distributed random variables.

Biological Data

A portion of the chinook salmon harvested by the sport fishery on the Klutina River was sampled for age, sex, and length information. Three scales were collected on the left side of each fish approximately two rows above the lateral line and on the diagonal row downward from the posterior insertion of the dorsal fin as described in Clutter and Whitesel (1956). Scales were mounted on adhesive-coated cards and impressions were made in cellulose acetate. Age determinations were made by examination of scales using a microfiche reader. Ages were designated using the European method (Koo 1962) where the first number refers to the number of years of freshwater residence after emergence and the second number refers to the number of years of marine residence. Fish lengths were measured from the middle of the eye to the fork of the tail to the nearest millimeter.

The proportional age composition of the sampled portion of the sport harvest was estimated for the fishery. Letting p_h equal the estimated proportion of age group h in the sample, the variance of p_h was estimated using the normal approximation to the binomial (Schaefer et al. 1979):

$$V(\hat{p}_h) = \hat{p}_h(1-\hat{p}_h)/(n_t-1), \qquad [14]$$

where n_t is the total number of legible scales collected from chinook salmon during the fishery.

Mean length at age and its variance were estimated using standard normal procedures.

Management Options

In addition to the creel survey information, the following question was asked of all interviewed anglers:

> "If the Department needs to further restrict the harvest of chinook salmon in the Klutina River sport fishery, which of the following regulations would you prefer:

a) spawning season closure on the lower river,
b) seasonal limit of 2-5 fish per angler,
c) close the river to fishing for chinook salmon 1 day per week."

RESULTS

Creel Estimates

The creel survey of the Klutina River sport fishery for chinook salmon was conducted from 1 July through 21 August 1988.

Sport Effort:

Boat Fishery. Boat counts during the survey periods ranged from 0 to 4 boats per survey (Appendix Table 1). Estimated effort during the survey was 201 boat-trips, with guided anglers accounting for 84% of the total estimated boat effort (Table 1). Effort was highest during weekdays for guided anglers and during weekends for unguided anglers.

Shore Fishery. Angler counts during the survey periods ranged from 0 to 13 shore anglers per survey (Appendix Table 2). Estimated angler-effort during the survey was 1,377 angler-hours with the highest effort recorded during the weekdays (Table 1).

Harvest Rates and Catch Rates:

Boat Fishery. Mean harvest and catch rates for guided boat anglers were 2.19 and 5.53 chinook salmon per boat-trip, respectively (Table 1). Unguided boat anglers had mean harvest and catch rates of 1.24 chinook salmon per boat-trip. Harvest rates for guided boat anglers were slightly higher on weekdays during the survey period while catch rates for guided boat anglers and harvest and catch rates for unguided boat anglers were highest on weekends.

Shore Fishery. Mean harvest and catch rates for shore anglers were 0.03 and 0.05 chinook salmon per angler-hour, respectively, with the highest rates recorded for weekends (Table 1).

Harvest and Catch:

Boat Fishery. The estimated catch of chinook salmon in the Klutina River boat fishery was 978 fish, of which 42.0% (411 fish) were harvested (kept) by anglers (Table 1). Guided anglers accounted for 96.1% of the total catch and 90.8% of the total harvest of chinook salmon in the boat fishery. Guided anglers harvested (kept) 39.7% of their total catch indicating that guided anglers release a majority of the chinook salmon they land. Conversely, unguided anglers harvested (kept) all of the chinook salmon they landed.

Shore Fishery. The estimated catch of chinook salmon in the shore fishery was 70 king salmon of which 55.7% (39 fish) were harvested (Table 1). Shore anglers accounted for only 6.7% of the total catch and 8.7% of the total estimated harvest of chinook salmon during the 1988 survey period.

Table 1. Klutina River creel survey estimates of chinook salmon sport catch and harvest totals and rates by angler type and by weekday and weekend, 1988.

		HARVEST					CATCH				
GUIDED BOAT ANGLERS	Effort[1]	Mean Rate	Total	Standard Error	Relative Precision	95% Confidence Interval	Mean Rate	Total	Standard Error	Relative Precision	95% Confidence Interval
Weekdays	114	2.41	275	61	43.7	154 - 394	5.37	612	218	69.7	186 - 1,039
Weekends	56	1.75	98	24	48.7	50 - 146	5.85	328	148	88.5	38 - 618
All Days	170	2.19	373	66	34.7	243 - 501	5.53	940	263	54.9	424 - 1,456
UNGUIDED BOAT ANGLERS											
Weekdays	8	0.00	0	0	----	0 - 0	0.00	0	0	----	0 - 0
Weekends	23	1.67	38	8	41.1	23 - 54	1.67	38	8	41.1	23 - 54
All Days	31	1.24	38	8	41.1	23 - 54	1.24	38	8	41.1	23 - 54
SHORE ANGLERS											
Weekdays	745	0.02	12	10	161.2	(8)- 32	0.04	31	26	162.8	(20)- 82
Weekends	632	0.04	27	10	71.8	8 - 46	0.06	39	22	111.6	(5)- 83
All Days	1,377	0.03	39	14	70.9	11 - 67	0.05	70	34	95.2	3 - 137

[1] Effort for boat anglers is in boat-trips, while effort for shore anglers is in angler-hours.

Age, Sex, and Length Composition of Harvested Chinook Salmon:

Chinook salmon age 1.3 and 1.4 were predominant in the sport harvest of the Klutina River fishery (Table 2). Mean lengths of harvested chinook salmon by sex and age group are summarized in Table 3.

Management Options:

Of the four possible management regulations proposed for the chinook salmon sport fishery on the Klutina River, the highest number of interviewed anglers (33.2%) expressing an opinion preferred a 1 day per week closure to sport fishing during the season (Table 4).

DISCUSSION

The estimated sport harvest of 450 chinook salmon in 1988 falls within the range of sport harvests estimated for the Klutina River over the past 5 years. Guided boat anglers had considerably higher catch and harvest rates than did unguided boat or shore anglers. While shore and unguided boat anglers released only 29% of the total chinook they caught, guided boat anglers released over 60%. As the number of guides operating on the Klutina River continues to increase (up 185% since 1986), catch and release angling for chinook salmon will continue to play a major part in the sport fishery. The predominant age class of chinook salmon in the sport harvest was age 1.3. Anglers indicated that they would prefer to see this fishery managed with a 1-day-per-week fishing closure rather than by spawning season closures or by limiting the number of fish they could harvest annually.

While the Klutina River downstream from the confluence of Manker Creek has previously been open year round to fishing for chinook salmon, a spawning season closure which was implemented by the Board of Fisheries will close this fishery after 10 August beginning in 1989. This was done in conjunction with spawning season closures for chinook salmon in the Gulkana River and the remainder of the Upper Copper River basin, and a seasonal limit of five king salmon per permit for the dip net fishery at Chitina to provide inriver protection of the limited spawning escapement of chinook salmon in the Copper River. The creel survey should continue in 1989 to assess the influence this regulation change has on the sport fishery in the Klutina River. Continued collection of age-at-length data by sex for the sport harvest of chinook salmon is necessary to determine exploitation by age class in the sport fishery.

ACKNOWLEDGEMENTS

We would like to thank Rick Ackerman who collected the field data, Douglas Reid who mounted and read the scales, and Doug Vincent-Lang who assisted in the data analyses.

Table 2. Estimated sex and age composition of chinook salmon in the sport harvest from the Klutina River during 1988.

Sex		Age Group					
		1.2	1.3	1.4	2.3	2.4	Total
Males	Sample Size	3	40	7	1	0	51
	% of Sample	2.6	34.5	6.0	0.9	0.0	44.0
	Standard Error	0.01	0.04	0.02	0.01	---	0.05
Females	Sample Size	4	34	25	1	1	65
	% of Sample	3.4	29.3	21.6	0.9	0.9	56.0
	Standard Error	0.02	0.04	0.04	0.01	0.01	0.05
Combined	Sample Size	7	74	32	2	1	116
	% of Sample	6.0	63.8	27.6	1.7	0.9	100.0
	Standard Error	0.02	0.04	0.04	0.01	0.01	---

Table 3. Mean length (mid-eye to fork-of-tail) in millimeters by sex and age group of chinook salmon sampled from the sport harvest in the Klutina River during 1988.

Age Group	Sample Size	Mean Length	Standard Error	Minimum Length	Maximum Length
Males (n = 51)[1]					
1.2	3	845.3	38.8	775	909
1.3	40	934.3	16.4	670	1091
1.4	7	971.9	23.6	891	1065
2.3	1	769.0	----	769	769
Females (n = 65)[1]					
1.2	4	717.5	45.2	629	796
1.3	34	913.9	10.2	800	1022
1.4	25	950.9	10.3	827	1062
2.3	1	977.0	----	977	977
2.4	1	1021.0	----	1021	1021
Combined (n = 116)[1]					
1.2	7	772.3	38.3	629	909
1.3	74	924.9	10.0	670	1091
1.4	32	955.5	9.5	827	1065
2.3	2	873.0	104.0	769	977
2.4	1	1021.0	----	1021	1021

[1] Sample Size

Table 4. Results of the survey conducted on sport anglers concerning possible management regulations for the chinook salmon fishery on the Klutina River, 1988.

	Proposal	Number	Percent
1.	Spawning season closure	81	27.7%
2.	Seasonal limit	60	20.5%
3.	One day per week closure	97	33.2%
4.	No opinion	54	18.5%

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APPENDIX

Appendix Table 1. Boat counts during the sport fishery for chinook salmon in the Klutina River during 1988.

DATE		PERIOD A	B	C	D
01-Jul		2		0	
02-Jul			1	2	
03-Jul				0	1
04-Jul		3			0
05-Jul			0		0
06-Jul	OFF				
07-Jul	OFF				
08-Jul		0		0	
09-Jul		0	1		
10-Jul				3	0
11-Jul			0		2
12-Jul		0		3	
13-Jul			3	1	
14-Jul	OFF				
15-Jul	OFF				
16-Jul		0			0
17-Jul			1	0	
18-Jul		0			1
19-Jul	OFF				
20-Jul	OFF				
21-Jul				0	0
22-Jul			1	0	
23-Jul				0	1
24-Jul		1	1		
25-Jul	OFF				
26-Jul	OFF				
27-Jul			1		4
28-Jul		1	3		
29-Jul		0			2
30-Jul			2		4
31-Jul		0		3	
01-Aug		1			1
02-Aug			2	0	
03-Aug		0		1	
04-Aug	OFF				
05-Aug	OFF				

-Continued-

Appendix Table 1. Boat counts during the sport fishery for chinook salmon in the Klutina River during 1988 (continued).

DATE		PERIOD A	B	C	D
06-Aug					1
07-Aug		2	3		
08-Aug			2		0
09-Aug			2	1	
10-Aug	OFF				
11-Aug	OFF				
12-Aug		1			0
13-Aug		1			0
14-Aug			2	3	
15-Aug	OFF				
16-Aug	OFF				
17-Aug		0		0	
18-Aug			1	0	
19-Aug			0		0
20-Aug		0			0
21-Aug			1	0	

Appendix Table 2. Shore angler counts during the sport fishery for chinook salmon in the Klutina River during 1988.

DATE	PERIOD			
	A	B	C	D
01-Jul	5		6	
02-Jul		12	13	
03-Jul			8	10
04-Jul	9			6
05-Jul		2		2
06-Jul OFF				
07-Jul OFF				
08-Jul	0		1	
09-Jul	1	0		
10-Jul			3	0
11-Jul		2		3
12-Jul	2		5	
13-Jul		2	4	
14-Jul OFF				
15-Jul OFF				
16-Jul	0			0
17-Jul		0	1	
18-Jul	1			1
19-Jul OFF				
20-Jul OFF				
21-Jul			1	0
22-Jul		0	0	
23-Jul			0	0
24-Jul	1	0		
25-Jul OFF				
26-Jul OFF				
27-Jul		0		0
28-Jul	5	1		
29-Jul	0			0
30-Jul		1		2
31-Jul	1		2	
01-Aug	3			0
02-Aug		0	0	
03-Aug	0		3	
04-Aug OFF				
05-Aug OFF				

-Continued-

Appendix Table 2. Shore angler counts during the sport fishery for chinook salmon in the Klutina River during 1988 (continued).

DATE	PERIOD			
	A	B	C	D
06-Aug				3
07-Aug	0	7		
08-Aug		3		4
09-Aug		4	2	
10-Aug OFF				
11-Aug OFF				
12-Aug	1			0
13-Aug	0			6
14-Aug		0	1	
15-Aug OFF				
16-Aug OFF				
17-Aug	1		0	
18-Aug		0	0	
19-Aug		0		0
20-Aug	0			0
21-Aug		1	0	